



To: Wendell Fischer
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Date: January 20, 2000
Subj.: Statement of Work for Pilot-Scale Soil Characterization Study

STATEMENT OF WORK

Scope of Work

The Subcontractor shall provide services to ISSI Consulting Group, Inc. (ISSI) for the Pilot-Scale Soil Characterization Study. The particular requirements for this project are outlined below. ISSI stipulates that the charges will be assessed for work according to the quotation (# 99000260-1) provided on September 17, 1999. Total charges for this project are not to exceed \$19,000. ISSI further stipulates that all method requirements and components of this statement of work must be met.

Laboratory Analysis

Indium Method Development

The Subcontractor will validate a method for Indium, using supplies provided by ISSI. These supplies consist of certified standards material, and a graphite furnace lamp specific to Indium analysis. Upon completion of all required analyses, the remaining standards material and the graphite furnace lamp will be returned to ISSI.

Analytical methods

The Subcontractor will quantitatively analyze for the metals and cations listed below. In addition, the subcontractor (Severn-Trent Laboratories) will analyze for pH, cation exchange capacity and total organic carbon. All analyses will be performed according to the methodology listed below. The Practical Quantitation Limits (PQL) listed in the table below will be met.

Analysis

Perform metals analysis, and measure physical parameters in surface soil and aqueous samples. The soil samples have been dried and sieved into two separate fractions: bulk (sieved to <2mm) and fines (sieved to <250 μ m). Samples will be transported under chain-of-custody for analysis by the following methods providing the project PQLs and all method requirements are achieved.

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Estimated values ("B") should be reported for results that are below the PQL but above the method detection limit (MDL).

Table 1 – Table of Target Analytes and Required Methods

Target Analyte	MDLs (ppm)	PQLs ^a (ppm)	Method ^b
Aluminum	0.33	1	6010B or 7000 series
Antimony	0.18	1	
Arsenic	0.15	1	
Barium	0.074	0.5	
Beryllium	0.028	0.4	
Cadmium	0.031	1	
Calcium	0.89	1	
Chromium	0.045	0.5	
Cobalt	0.016	0.3	
Copper	0.093	1	
Iron	1.1	10	
Lead	0.17	1	
Magnesium	0.27	1	
Manganese	0.075	0.5	
Mercury		0.2	7471A
Nickel	0.066	0.5	
Potassium	85	100	
Selenium	0.28	1	
Silver	0.033	1	
Sodium	9.5	50	
Thallium	0.37	1	
Vanadium	0.045	0.5	
Zinc	0.071	1	
Indium		1	
Sulfate	2.0	6	9056
Chloride	1.0	3	9056

PQL – Practical Quantitation Limit in units of mg/kg.

a - PQLs provided in this table are based upon 100% dry-weight.

b – SW-846 (USEPA 1986)

Table 2: Physical Parameters Analysis and Required Methods

Physical Parameter	Method ^a
Total Organic Carbon	9060
Cation Exchange Capacity	9080/9081
pH	9045C

^a - SW-846 (USEPA 1986)

Deliverables

The Subcontractor will provide ISSI with the following deliverable package within 10 working days of receipt of samples at the Subcontractor's laboratory: analytical report, quality control report raw data and electronic disk deliverable. The specific contents of each deliverable component are outlined below.

Analytical Reporting

Contract Laboratory Program (CLP)-like data packages will be required for all laboratory analytical data. These CLP-like data packages will include a case narrative, copies of all associated raw data, sample results and all associated QC summaries. A summary of the data package requirements is shown below:

Section I

Case Narrative

1. Case narrative
2. Copies of nonconformance/corrective action forms
3. Copies of sample receipt notices
4. Internal tracking documents, as applicable
5. Copies of all chain-of-custody forms

Section II

Analytical Results - All results will be reported on a dry weight basis.

1. Results for each parameter including dilutions and reanalysis (dry-weight basis)
2. Units of measure
3. Practical Quantitation Limit
4. Date of sample analysis
5. Date of sample receipt
6. Date of sampling
7. Dilution factor

Section III

QA/QC Summaries

1. Method blanks, continuing calibration blanks, preparation blanks, instrument blanks
2. Initial and continuing calibration verifications
3. Interference check samples for inductively coupled plasma (ICP, ICP/MS) and graphite furnace atomic absorption (GFAA)
4. Matrix spikes and post-digestion spikes
5. Laboratory control samples
6. Method of standard additions
7. ICP, ICP/MS serial dilution
8. Instrument detection limits

Section IV

Instrument Raw Data – Sequential measurement readout records for ICP, ICP/MS, graphite furnace atomic absorption (GFAA), which will include the following information, as applicable:

1. Environmental samples, including dilutions and reanalyses
2. Initial calibration (including reporting whether $r^2 \geq 0.995$)
3. Initial and continuing calibration verifications
4. Method blanks, continuing calibration blanks and preparation blanks
5. ICP, ICP/MS interference check samples
6. Matrix spike and post-digestion spikes
7. Matrix spike duplicate samples
8. Laboratory control samples
9. Method of standard additions
10. ICP, ICP/MS serial dilution

Section V

Other Raw Data

1. Sample digestion and preparation logs
2. Instrument analysis logs for each instrument used
3. Standard preparation logs, including initial and final concentrations for each standard used

Section VI

Electronic Data – All analytical data will be supplied in electronic form as well as hardcopy form. All data will be provided in an ASCII format, using the data fields included on the attached spreadsheet.

Turn-around-time Requirements:

- 1) Analytical Results via facsimile and electronic mail. The email copy should be sent to the following address: abradley@issiinc.com and mgoldade@issiinc.com, 10 working days from receipt of samples, to be submitted on a weekly basis.
- 2) Complete CLP-like data package:
15 working days from receipt of all samples.